

CLAIMS

What is claimed is:

1. An apparatus to intervascularly promote hemostasis at a blood vessel puncture site having an inner lumen pressure and an outer lumen pressure, comprising:
  - a flexible plug having a center, a top surface, and a bottom surface; and
  - a release mechanism coupled to the center to position and release the flexible plug intervascularly at the blood vessel puncture site;wherein the inner lumen pressure is greater than the outer lumen pressure to forceably secure said flexible plug around the blood vessel puncture.
2. The apparatus of claim 1 further comprising at least one resilient attachment member to secure the flexible plug around the blood vessel puncture.
3. The apparatus of claim 2 further comprising a hemostatic material surrounding the at least one resilient attachment member to promote hemostasis around the at least one resilient attachment member.
4. The apparatus of claim 1 wherein the release mechanism further comprises an entrance port to receive a flow of blood from the blood vessel.
5. The apparatus of claim 1 wherein an area of the flexible plug is greater than an area of the blood vessel puncture.
6. The apparatus of claim 1 wherein the flexible plug may have a plurality of slits to securely fit around an irregular blood vessel puncture site.
7. The apparatus of claim 1 further comprising a guidewire coupled to the center of the flexible plug to position the flexible plug.

8. The apparatus of claim 7 wherein the center of the flexible plug is made of a hemostatic material.
9. The apparatus of claim 1 where the release mechanism further comprises a suture having a first end and second end, the first end threaded through the top surface.
10. The apparatus of claim 9 wherein the first end is secured with a knot at the bottom surface.
11. The apparatus of claim 9 wherein the first end is secured with an adhesive to the bottom surface.
12. The apparatus of claim 9 wherein the first end is threaded through the top surface and the bottom surface thereby forming a loop at the bottom surface.
13. The apparatus of claim 9 further comprising an o-ring coupled to the first end.
14. The apparatus of claim 1 further comprising a pusher having a first end positioned at the center surrounding the release mechanism.
15. The apparatus of claim 14 wherein the flexible plug surrounds the pusher at the first end.
16. The apparatus of claim 14 wherein the pusher, flexible plug, and release mechanism are received by a lumen of a sheath.
17. The apparatus of claim 14 wherein the pusher further comprises an entrance port to receive a flow of blood from the blood vessel.
18. The apparatus of claim 16 wherein the sheath further comprises an entrance port to receive a flow of blood from the blood vessel.
19. The apparatus of claim 14 wherein the pusher further comprises at least one expandable member to expand the flexible plug within the blood vessel.

20. The apparatus of claim 1 wherein the release mechanism comprises a resilient extension member coupled to the center of the flexible plug, the resilient extension member having an aperture at a top.
21. The apparatus of claim 20 further comprising an suture looped through the aperture.
22. The apparatus of claim 20 wherein the resilient extension member is made of hemostatic material.
23. The apparatus of claim 22 wherein the extension member is encapsulated with a biocompatible dissolvable capsule.
24. The apparatus of claim 20 wherein the resilient extension member further comprises a hemostatic material positioned at a center of the resilient extension member.
25. The apparatus of claim 24 wherein the resilient extension member is encapsulated with a biocompatible dissolvable capsule.
26. The apparatus of claim 1 wherein the release mechanism comprises a hemostatic material coupled to the center of the flexible plug and a resilient extension member coupled to the hemostatic material opposite the flexible plug.
27. The apparatus of claim 27 wherein the hemostatic material is encapsulated in a biocompatible dissolvable capsule.
28. The apparatus of claim 27 further comprising a suture looped through the aperture.
29. An apparatus to position and release a flexible plug at a blood vessel puncture site, comprising:

a first connector having a lumen, a first end, second end, a first notch positioned near the second end, said first connector first end coupled to a center of the flexible plug;

a second connector having a lumen, a top, a bottom, and a second notch positioned near the bottom;

wherein the second connector bottom is received by the first notch and the first connector second end is received by the second notch.

30. The apparatus of claim 29 further comprising a guidewire received by the second connector lumen and the first connector lumen to secure the first connector and the second connector together.

31. The apparatus of claim 29 wherein the first connector further comprises an entrance port positioned substantially near the first end to receive a flow of blood from the blood vessel.

32. The apparatus of claim 31 wherein the second connector further comprises an exit port positioned substantially near the second end top, wherein the flow of blood entering the entrance port exits.

33. The apparatus of claim 29 further comprising a hemostatic material coupled to the first connector first end.

34. An apparatus to position and release a flexible plug at a blood vessel puncture site, comprising:

a release mechanism coupled to a center of the flexible plug at a first end, the placement tube having a latching member at a second end; and

a placement tube having a lumen to receive the release mechanism and a notch to mate with the latching member.

35. The apparatus of claim 34 wherein the release mechanism is made of a biocompatible dissolvable material.
36. The apparatus of claim 34 further comprising a guidewire received by the placement tube lumen to secure the latching member to the notch.
37. The apparatus of claim 34 wherein the notch extends through the placement tube.
38. An apparatus to position and release a flexible plug at a blood vessel puncture site, comprising:
- a first connector having a first end coupled to a center of the flexible plug, a second end, and a first ring positioned at said second end;
  - a second connector having a top, a bottom, and a second ring positioned at said bottom; and
  - a positioner coupled to the second connector substantially near the second ring thereby forming a recess to receive and position the first ring.
39. The apparatus of claim 38 further comprising a guidewire to be received within the first and second ring.
40. An apparatus to promote hemostasis at a blood vessel puncture site having an inner lumen pressure and an outer lumen pressure, comprising:
- a flexible disk to intervascularly seal a blood vessel puncture site;
  - a hemostatic body to intravascularly seal the blood vessel puncture site; and
  - a connector to couple the flexible disk to the hemostatic body, the connector positioned within a wall of the blood vessel puncture site;
- wherein the inner lumen pressure is greater than the outer lumen pressure to forceably secure said flexible disk around the blood vessel puncture site.

41. The apparatus of claim 40 wherein the connector has a smaller diameter than a flexible disk diameter and a hemostatic body diameter.
42. The apparatus of claim 40 further comprising a release mechanism coupled to the hemostatic body.
43. The apparatus of claim 42 wherein the release mechanism is a suture having a first end secured with an adhesive to the hemostatic body.
44. The apparatus of claim 40 wherein the release mechanism comprises a resilient extension member coupled to the center of the hemostatic body, the resilient extension member having an aperture at a top.
45. The apparatus of claim 44 further comprising an suture looped through the aperture.
46. The apparatus of claim 44 wherein the resilient extension member is made of hemostatic material.
47. The apparatus of claim 46 wherein the extension member is encapsulated with a biocompatible dissolvable capsule.
48. The apparatus of claim 44 wherein the resilient extension member further comprises a hemostatic material positioned at a center of the resilient extension member.
49. The apparatus of claim 48 wherein the resilient extension member is encapsulated with a biocompatible dissolvable capsule.
50. A method for promoting hemostasis intervascularly at a blood vessel puncture site having an inner lumen pressure and an outer lumen pressure, comprising:  
    locating a blood vessel puncture site;

inserting a hemostatic pressure plug through a tissue tract, the hemostatic pressure plug having a center;

deploying the hemostatic pressure plug into a blood vessel lumen;

positioning the hemostatic pressure plug around the blood vessel puncture site;

and

releasing a release mechanism removably attached to the center of the hemostatic pressure plug;

wherein the inner lumen pressure is greater than the outer lumen pressure to forceably secure said flexible plug around the blood vessel puncture site.

51. The method of claim 50 further comprising withdrawing the release mechanism from the tissue tract.

52. The method of claim 50 wherein said inserting further comprises, inserting the hemostatic pressure plug through an introducer located within the tissue tract.

53. The method of claim 50 wherein said deploying further comprises pushing said hemostatic pressure plug with a pusher.

54. The method of claim 50 wherein said release mechanism comprises a suture having a first end secured at the center of the hemostatic pressure plug.

55. The method of 54 wherein said releasing further comprises cutting said suture below a skin surface at a second end.

56. The method of claim 50 wherein said release mechanism further comprises a suture having a first end is threaded through a top surface of the hemostatic pressure plug

and a bottom surface of the hemostatic pressure plug thereby forming a loop at the bottom surface.

57. The method of 56 wherein said releasing further comprises withdrawing a first end of the suture out of the tissue tract.

58. The method of claim 50 further comprising inserting a hemostatic pledget adjacent the blood vessel puncture site.